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USSR Report

ENERGY

No. 73



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CONTENTS

FUELS

Geological Prospecting Work for Coal in Baykal-Amur Railroad Zone (V. F. Cherepovskiy; RAZVEDKA I OKHRANA NEDR, May 81).....	1
Problems of Developing Gas-Chemical Complexes Examined (A. I. Gritsenko; GAZOVAYA PROMYSHLENNOST', Jul 81)	8
Experience in Compiling Economic Geology Maps in Kazakhstan (O. V. Ivanov, K. Sh. Satybaldin; RAZVEDKA I OKHRANA NEDR, May 81)	14
Methods, Equipment for Improving Caspian Offshore Oil, Gas Recovery Told (K. A. Abasov; AZERBAYDZHANSKOYE NEFTYANOYE KHOZYASTVO, Jun 81)	19
Ships for Caspian Oilfields Not Getting Proper Repair Support (Yu. Smetanin; TURKMENSKAYA ISKRA, 19 Jul 81)	23
Oil Found in Azerbaijan's Kura Depression (V. Gol'tsev; VYSHKA, 28 Jul 81)	26
Recent Progress at Samotlor Oilfield Summarized (VYSHKA, 28 Jul 81)	28
Success of Nagornaya Coal Mine Explained (A. Trutnev; SOVETSKAYA ROSSIYA, 18 Jul 81)	29
Accelerated Development of Kansk-Achinsk Coal Urged (V. Zubkov; SOTSIALISTICHESKAYA INDUSTRIYA, 25 Jul 81)	34
Farming, Coal Mining Interests Clash in Karakany (P. Voroshilov; IZVESTIYA, 11 Jul 81)	38
Briefs	
Surgut-Polotsk Pipeline Construction	42
Karakalpak Town Gets Gas	42

FUELS

GEOLOGICAL PROSPECTING WORK FOR COAL IN BAYKAL-AMUR RAILROAD ZONE

Moscow RAZVEDKA I OKHRANA NEDR in Russian No 5, May 81 pp 8-12

[Article by V. F. Cherepovskiy, USSR Geology Ministry]

[Text] The development of territorial-industrial complexes (TIC) and industrial centers (IC) in the BAM [Baykal-Amur Mainline] zone is unthinkable without a powerful coal base, which in addition to supplying fuel to the local principal users would be a supplier of coke to the metallurgical industry. In the course of regional and detailed geological mapping and geological prospecting work it has been possible to define the Yuzhno-Yakutskiy and Bureinskiy coal basins and evaluate the coal potential of other areas. However, without a railroad a high percentage of these resources has remained inaccessible for industrial use. Now, with the activation of the northern branch of the Tynda-Perkakit highway, it is possible to exploit the coking coals of the Yuzhno-Yakutskiy coal basin.

It should be noted that the coal basins and deposits situated in the zone of the Baykal-Amur Railroad have been studied inadequately and the degree of their industrial exploitation is low. Coal is produced in small quantities only in the Yuzhno-Yakutskiy and Bureinskiy basins. However, the principal coal industry areas are situated to the south of the zone of construction of the Baykal-Amur Railroad in the zone extending toward the Trans-Siberian Line. There has been little study of the coal potential of the Mesozoic deposits in the northern part of Transbaykalia, in the Tyndinskaya, Verkhne-Zeyskaya, Tyrminskaya and Udskeya depressions, or in the Cenozoic deposits of Cis-Baykalia, the neighborhood of Lake Baykal and the lower reaches of the Amur. There is only the most modest information in the literature concerning the coal resources of these areas. Accordingly, an important task of geological prospecting organizations carrying out exploration for coal during the Eleventh Five-Year Plan and thereafter is reconnaissance for and industrial evaluation of the known major deposits of fuel and coking coals. There must be a supplementation of the explored coal deposit reserves in the zone of influence of the Trans-Siberian railroad, with intensification of exploration work along the route of the Baykal-Amur Railroad for the purpose of the soonest possible discovery of new deposits, especially of coking coals, and the implementation of their detailed study.

In the northern part of Irkutskaya Oblast, where the wood-processing and cellulose branches of industry are being developed, the Verkhne-Lenskiy TIC is being created (see map). As the fuel-energy base for this complex it will be possible to use the coals of the southern part of the Tunguskiy basin (Zheronskoye and Zelendinskoye

deposits) and the brown coals of the Cenozoic depressions of the Predbaykal'skiy (Cis-Baykal) downwarp. The Zheronsko-Zelendinskoye deposit is situated 40 km to the north of Ust'-Ilimsk. Three working strata have been defined there: one of Lower Carboniferous age and two of Permian age. The upper stratum with a thickness of 2-11 m is of the greatest importance; everywhere it is suitable for strip mining. The grade of these coals is varied; most belong to grades Π and Γ , W^a 1.5-7.5%, A^c 22%, δ total 0.4%, V^8 18-47%, Q_6^8 $27-34 \cdot 10^{-3}$ J. The deposit must be studied in detail because it is regarded as a fuel base for the Ust'-Ilimskiy Combine. Also meriting special attention are the brown coals of the Cenozoic depressions, since they lie at shallow depths in the form of thick strata which can be worked by the strip method. These coals are situated directly in the territory of the TIC, which evidently will be able to compensate completely for their being of a lower quality than the Tunguskiye coals.

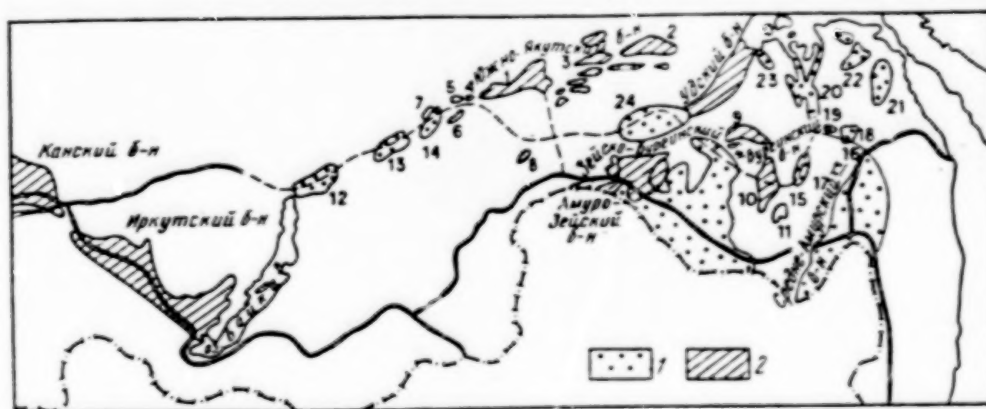


Fig. 1. Map of location of coal basins and deposits in the regions of construction of the Baykal-Amur railroad. Coal basins and deposits: 1) Cenozoic, 2) Mesozoic; 2) coal-bearing structures (depressions and grabens): 1) Aldano-Chul'manskaya and Usmunskaya, 2) Tokinskaya, 3) Ytymdzhinskaya, 4) Kudulinskiy, 5) Khaninskiy, 6) Kalarskiy, 7) Kodarskiy, 8) Nyukzhinskiy, 9) Gerbikano-Ogodzhinskaya, 10) Verkhne-Bureinskaya, 11) Tyrminskaya, 12) Verkhneangarskaya, 13) Muyskaya, 14) Charskaya, 15) Amgun'skaya, 16) Khurmulin'skaya, 17) Kurskaya, 18) Evoronskaya, 19) Chukchagirskaya, 20) Tugur-Kerbinskiye, 21) Nizhneamurskaya, 22) Ul-Langeriyskiye, 23) Toromskaya, 24) Verkhnezeyskaya.

According to data published by M. G. Suslova. et al.^{*}, in the Kazachinsko-Lenskiy region, 40 km to the southwest of the route of the Baykal-Amur railroad, as a result of surface geophysical and exploratory drilling work it has been possible to locate a deposit of Paleogene brown coals. Coal-bearing deposits are associated with the Khandinskaya depression, constituting a series of local meridionally extended depressions. The rocks of the Bulusinskaya suite of the Paleogene (Middle-Upper Oligocene) are coal-bearing. In the section it was possible to define nine coal strata of simple and complex structure with a thickness from 1 to 37 m. Each stratum consists of two or three layers of coal containing intercalations of coal clays, clays and less frequently sands with a thickness of 0.3-1 m. The maximum total thickness of the strata (45 m) is observed at the center of the depression and the minimum was along its margins; the average is 20 m. The depth of the top

^{*} Suslova, G., Gorbunova, E. E. and Strelyuk, T. L. (et al.), "Coal Deposits in the BAM Region," RAZVEDKA I OKHRANA NEDR (Prospecting and Mineral Conservation), No 12, pp 13-15, 1979.

varies from 7.5 to 195 m. Accordingly, in the coming five-year plan it is desirable that the "Irkutskgeologiya" Association proceed on a broad scale to coal exploration-evaluation work in the Cenozoic depressions of Cis-Baykalia for selecting areas for the planning of exploration work. It is also necessary to continue exploration work in the southern part of the Tunguskiy basin for the purpose of defining the most favorable areas for the strip mining of coal.

In the territory of the Severo-Baykal'skiy TIC at the present time areas with an established industrial reserve of coal are lacking. Coal strata with a workable thickness were defined during work done earlier within the limits of the large (about 3000 km²) Barguzinskaya depression, situated farther to the south, which together with the Bodonskoye brown coal deposit is recommended by the "Buryatgeologiya" Combine as the primary areas for geological prospecting work. It is necessary to proceed to a search for Neogene coals in the Verkhne-Angarskaya, Muyskiye and other Cenozoic depressions of Northern Trans-Baykalia and continue the search for Mesozoic coals in the Okino-Klyuchevskaya and Ushmunskaya depressions and preliminary exploration of the Erdem-Galgatayskoye deposit in the Tugnuyskaya depression.

In the forming of the Udokanskiy IC, where plans call for the development of non-ferrous and possibly also ferrous metallurgy, it is also possible to use the coking coals of the Apsatskaya depression and the ordinary coals of the Verkhne-Kalarskaya depression. The principal task of the "Chitageologiya" Association in this region is the completion of reconnaissance-evaluation work at the largest Apsatskoye deposit, containing high-quality coals of coking grades and with a follow-up to preliminary exploration. In structural respects the mentioned deposit is a synclinal fold of the Sunduchnyy type, almost everywhere bounded by dislocations. According to data published by A. G. Portnov, et al.^{*}, the industrial concentrations of coal in the Apsatskoye deposit are associated with two horizons: lower and upper. The overwhelming quantity of the coal reserves is localized in the lower horizon. Its maximum coal saturation is observed on the northern, eastern and southeastern flanks, where 3-14 coal strata with a working thickness are found.

The total thickness of the strata everywhere exceeds 10 m, in some cases attaining 43-67 m with a thickness of the individual strata 11-19 m. The upper coal-bearing horizon consists of 1-5 working strata with a total thickness of 5-13 m, which, in contrast to the strata in the lower horizon, are characterized by a complex structure. The cited data are indicative of the high prospects of the Apsatskoye deposit. Simultaneously with a more detailed study of this area it is necessary to proceed to an investigation of other coal-bearing areas situated in the Kodaro-Udokanskiy region of coal-bearing areas, especially the Sredne-Sakukanskaya area, where on the basis of general geological conditions it is possible to anticipate a gentler character of the bedding of coal strata. It is also recommended that exploration work for fuel coals be resumed in the Verkhne-Kalarskaya depression, in which the extent of the presence of coal has not yet been finally established. The Yuzhno-Yakutskiy coal basin is situated within the territory of the Yuzhno-Yakutskiy TIC. Here during recent years, as a result of a gap between geological survey, exploration and exploration-evaluation work, on the one hand, and geological prospecting work, on the other hand, a definite shortage of areas under exploration has arisen. For this reason in the years immediately ahead there must be large-scale planning

^{*} Portnov, G., Cherepovskiy, V. F., Pereyaslavskiy, I. V., et al., "New Region of Coking Coals Along the BAM," SOV. GEOLOGIYA (Soviet Geology) No 3, pp 38-43, 1980.

of geological survey and exploration work in combination with geophysical investigations in the Usmunskiy, Aldano-Chul'manskiy and Tokinskiy regions for the purpose of preparing a base for geological prospecting work. It is also proposed that work be continued on preliminary and detailed exploration of known deposits in the basin. During recent years there has been an increase in the raw material base of the coal industry in the basin. The Neryungrinskiy drift mine has been constructed. Work has been completed on a detailed reconnaissance of the major Chul'manskoye deposit of coking coals. The reserves of another major area, the Denisovskoye deposit, are being evaluated.

During the Eleventh Five-Year Plan most of the geological prospecting work must be concentrated in the Aldano-Chul'manskiy region, especially in the Kabaktinskoye deposit and in the Kholodnikanskaya area (Berkakitskoye deposit). The southeastern part of the Verkne-Taluminskoye deposit is of definite interest; it is characterized by moderate quantities of coal in the Durayskaya and Kabaktinskaya suites. In the future it may be joined to the field of the Chul'manskaya mine. In the western region the most promising area of exploration work is the Aldanskoye deposit, where there is a high coal content of deposits of the Durayskaya and Kabaktinskaya suites. As a result of a preliminary and detailed exploration of the Kabaktinskoye deposit it is anticipated that the plan for the increase in explored strata for the reserves will be met. In the remaining area of the deposit, and also in the Lokuchakitskiy, Berkakitskiy and Verkhne-Yakokitskiy sectors, it is recommended that there be preliminary and detailed exploration work. These sectors are characterized by a relatively simple geological structure, contain several coal strata with a workable thickness (3-5 m), have considerable conditional geological reserves of coals of the deficit grades Ж, КЖ and К with a low ash content and a small sulfur content, and finally, are situated relatively close to the route of the Amuro-Yakutskaya highway and the explored sectors of the Chul'manskoye deposit. Here new reserve areas for the coal industry can be prepared in the coming five-year plans.

After 1985 detailed exploration work will be carried out in the remaining areas of the Aldano-Chul'manskiy region. Reconnaissance and exploration work on a broad scale is to be continued in the Usmunskiy and Tokinskiy regions. The stages in geological exploration work in these regions will be determined by the results of exploration work, but even now it is possible to speak of considerable prospects of the western part of the Usmunskiy region (Syllakhskoye and Nemaktinskoye deposits) and the southern part of the Tokinskiy region (El'ginskoye and Certandin-skoye deposits). The principal users of coking and fuel coals of the Yuzhno-Yakutskiy basin will be: Yuzhno-Yakutskiy TIC with its developing mining industry, Tyn-dinskiy TIC, a center of the Baykal-Amur Railroad, where transportation warehousing is concentrated, as well as electric power transmission lines, forest and forest-processing industries, etc., and also the Zeysko-Svobodnenskiy TIC with forest, wood-processing and cellulose industries, machine building, and possibly ferrous metallurgy. In order to ensure a full supply of coal to the TIC it is necessary to carry out exploration work over the territory of the Amuro-Zeyskiy Mesozoic coal basin (Depskaya area) and in the central parts of the Zeye-Bureinskiy Cenozoic brown coal basin (Mukhinskaya, Klimoutsevskaya, Semenovskaya, Yerkovetskaya and other coal-bearing areas). On the basis of the results of these studies in the most promising sectors in the future exploration work must be carried out

by the "Dal'geologiya" Association.

Particular attention must be devoted to the Yerkovetskoye deposit for the purpose of completing detailed exploration in 1984 and obtaining an increment of coal reserves of 200-250 million tons, suitable for exploitation by strip mining. This deposit is situated 40 km to the east of Blagoveshchensk. Here a stratum of brown coal has been discovered which has a thickness up to 7 m. The coal is of technological group B_2 with a moisture capacity of the working fuel 34%, average ash content 10-20% and lowest heat of combustion $\sim 12\,500$ J. The coal is suitable for fuel purposes. The deposit will evidently soon be brought into industrial exploitation because the reserves of the principal supplier of fuel coals for the Far East, the Raychikhinskoye deposit, in the next few years will be worked out. Accordingly, the accelerated exploration of the Yerkovetskoye deposit in the Eleventh Five-Year Plan, especially its western part, which is the most favorable, is extremely necessary.

The Ural'skiy IC is based primarily on the coals of the Bureinskiy basin, which is a supplier of regular coal. It is assumed that in the long run this center will be expanded by the exploitation of the Gerbikano-Ogodzhinskiy and Tyrminskiy coal-bearing regions. Its principal field of specialized production is clearly defined: coal production. Therefore, in the immediate future it is necessary that there be exploration and exploration-evaluation work here, as well as preliminary exploration in the most promising sectors containing coals with a reduced ash content, especially in the southeastern and northwestern parts of the basin. However, the central part (Kyndal'skiy graben) is characterized by a minimum coal content in the section of Upper Mesozoic deposits and can be classified as little-promising. The first and foremost areas for study are the Yuzhno-Bureinskaya and Urgalo-Olanzhinskaya coal-bearing areas adjoining the highly explored and exploited Ural'skoye deposit of ordinary coal. The industrial presence of coal in these areas is associated with deposits of Urgal'skaya and Chagdomynskaya suites. In the southern part of the basin it is possible that sectors with low-ash coals will be discovered. It is necessary to continue the study of Bureinskiye coals for the purpose of using them in the coke-chemical industry. This is one of the very important problems in the rational use of coals in this basin in the national economy.

In the Eleventh Five-Year Plan it is proposed that exploration work be carried out for a reevaluation of the quantities of coal available in the Gerbikano-Ogodzhinskiy coal-bearing region, the economic importance of which is increasing in connection with its close location relative to the Baykal-Amur Railroad zone. The prospects of the region are associated with the possibility of an increase in the capabilities for the strip mining of coal and the discovery of coals suitable for coking. The Tyrminskiy coal-bearing region is regarded as promising for the creation of additional capabilities of the Bureinskiy basin in relation to the favorable prospects for the discovery of deposits here with low-ash coals for power production and possibly for coking. The Sutyr'-Gudzhalskaya coal-bearing area is most favorable in this respect; it adjoins the Izvestkovaya-Chegdomyn railroad.

The most easterly Komsomol'skiy TIC, where there has been development of ferrous and nonferrous metallurgy, machine building, petroleum refining, forest, wood-processing and cellulose-paper industries, in addition to the coals brought in from

the Yuzhno-Yakutskiy TIC and the Ural'skiy IC, requires coal of local deposits. Accordingly, in the years immediately ahead it is necessary to continue detailed exploration work in the Lianskoye brown-coal deposit with an increment of the yield from strip mines of 3 million tons of coal annually. The deposit is situated along the route of the Baykal-Amur Railroad at a distance of 32 km from Komsomol'sk-na-Amure. Here it was possible to define eight coal strata, of which six attain a thickness of 1-15.3 m. The coals are brown with the lowest heat of combustion of the working fuel 10 500 J, a mean ash content of 21.3 and a moisture content of the working fuel 40%. The deposit is suitable for exploitation by strip mining. It is necessary to continue exploration and exploration-evaluation work for brown coals for exploitation by strip mining in the northern part of the Sredne-Amurskiy basin, and also the brown coals accessible for exploitation by strip mining in the Amgun'skaya and other coal-bearing areas of the eastern part of the considered territory.

The creation of a major coal base in the zone of the Baykal-Amur Railroad is associated primarily with the exploitation of Neryungrinskoye deposit of the Yuzhno-Yakutskiy basin and expansion of production in the Bureinskoye basin. The production of coking coals in the Chul'manskoye and Denisovskoye deposits must be organized, as is also true of the brown coals of the Lianskoye deposit. In the more distant future the remaining deposits of the Aldano-Chul'manskiy, Usmunskiy and Tokinskiy regions of the Yuzhno-Yakutskiy basin, the Kodaro-Udokanskiy, Gerbikano-Ogodzhinskiy and Tyrminskiy coal-bearing regions, the Amuro-Zeyskiy, Zeye-Bureinskiy and Sredne-Amurskiy basins and other coal-bearing basins will be explored and gradually brought into production for broadening and further developing the coal base of the territory of the Baykal-Amur Railroad zone.

The scientifically sound planning of geological prospecting work is closely related to the results of scientific research, specialized studies and their generalization. There must be development of directions of scientific research work associated with local quantitative and qualitative prediction of coal areas and the development of a rational complex of exploration methods applicable to the specific geological and natural conditions of promising regions. In particular, it is necessary to investigate the internal structure of coal-bearing structures (depressions), make a detailed study of the stratigraphy, mineralogical composition of coals and coal-bearing deposits, the formations to which they belong, paleogeographic and paleotectonic conditions of peat accumulation, patterns of spatial distribution of areas of coal formation within Mesozoic and especially poorly studied Cenozoic depressions, the morphology of coal strata, etc.

In the plans of scientific research institutes provision must be made for quantitative and qualitative evaluations of the quantities of coal available in the Usmunskaya and Tokinskaya depressions of the Yuzhno-Yakutskiy basin, the Charskaya, Verkhne-Muyskaya and Verkhne-Angarskaya depressions, the Predbaykal'skiy downwarp and the Gerbikano-Ogodzhinskaya area, a study of the conditions for the sedimentation of coal-bearing strata in the Bureinskiy basin for the purpose of choosing the directions for search for coals of a reduced ash content suitable for the coking industry. Finally, it is necessary to evaluate the reserves of coking coals in the Mesozoic deposits in the new areas of the Far East, make a detailed study of the technological properties of gas sintering coals for use in a coking charge,

determine the metal content of Cenozoic coals and the possibility of using brown coals in other branches of the national economy.

In solving the formulated problems it is recommended that there be development of a general work program for 1981-1985 providing for the development of exploration and scientific research along the zone of the Baykal-Amur Railroad and in a more extensive region centering on this route, which will make it possible to study the prospects for finding coal in the mentioned territory. Such a work program must be drawn up by the All-Union Coal Scientific Research for Geological Prospecting of Coal in collaboration with the All-Union Geological Scientific Research Institute and geological associations in 1981. The implementation of these tasks in the directions of geological prospecting and scientific research work will to a great extent ensure the development of the coal industry in the zone of exploitation of the Baykal-Amur Railroad.

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PROBLEMS OF DEVELOPING GAS-CHEMICAL COMPLEXES EXAMINED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 7, Jul 81 pp 2-5

[Article by A. I. Gritsenko, director of All-Union Scientific Research Institute of Natural Gases: "Basic Problems of Developing Gas-Chemical Production"]

[Text] The experience of creating and operating gas-chemical complexes (GCC) and the modern research of scientists of the branch in the area of gas refining prompt more economical ways to separate valuable chemical raw materials from the hydrocarbon fractions.

The problem of the complex use of hydrocarbon raw material has great national economic importance. Oil, natural and oil gas, and condensate are the main sources of hydrocarbon raw material for large-scale chemical production.

At the current stage, satisfaction of the needs of the country's national economy for the most important types of chemical products depends to a considerable measure on the scales of ethylene production, the original raw material for chemistry.

Two types of hydrocarbon raw material are used in world practice to produce ethylene and other olefins and aromatic hydrocarbons that accompany it: liquid petroleum fractions (directly distilled gasolines and gas oil fractions) and natural gas components (ethane, liquefied gases). The first currently occupies the leading place in our country's industry.

It was still assumed 5-10 years ago that the rise in volumes of oil refining would mainly ensure production of olefin and aromatic hydrocarbons by directly distilled fractions without significant damage to the production of automobile gasoline and diesel fuels. However the shortage of oil fractions has risen sharply at present, a significant rise in volumes of primary oil refining is not expected, and therefore the task of supplying oil raw material is associated with more intensive oil refining.

Heavy petroleum fractions and mazut are thus becoming not so much fuel, as reserve chemical raw material. This intensification of oil refining which consists of converting dark petroleum products into light, is accompanied by significant current and capital outlays.

Consequently, the problem arises of looking for alternative and reliable sources of hydrocarbon raw material for chemical product production.

Hydrocarbons which are contained in natural gas, and first of all, ethane, are an effective source of hydrocarbon raw material.

The outlook for and efficiency of extracting ethane from natural gas are confirmed by many years of experience of development of the U.S. industry where the main quantity of ethylene is produced from ethane and liquefied gases.

In our country, the gas refining industry is successfully developing based on oil and natural gases. A powerful raw material base has been set up for the gas refining industry. Analysis of the structure of the gas reserves as valuable chemical raw material demonstrated that 11.9 trillion m^3 of gas reserves are characterized by ethane content of over 3% and are conditioned for refining at the gas-chemical complexes. The explored reserves contain about 4 trillion m^3 of hydrogen sulfide-containing gases.

The ethane-containing gases are widespread in the regions of the Ural-Volga region, Dneprovskiy-Donetsk basin. They are characteristic for the Lower Cretaceous and Jurassic deposits of West Siberia, East Turkmeniya and West Uzbekistan, and for the Paleozoic deposits of East Siberia and the Far East. The Orenburg, Vuktyl, West Krestishchenskiy, Urengoy, Zapolyarnyy, Yamburgskiy, Shurtanskiy and others are the largest fields of these gases.

Hydrogen sulfide-containing gases are widespread mainly in the regions of the Ural-Volga area, East Turkmeniya and West Uzbekistan. The Orenburg, Astrakhan, Shurtanskiy and Zevardinskiy are the largest fields.

The world's largest raw material base for extraction and refining of gas and gas condensate has been made and continues to expand because of the discovery of unique gas fields in West Siberia.

In the Neocomian deposits of northern West Siberia, 4 trillion m^3 of gas reserves have been explored. The largest fields in this complex are the Urengoy, Zapolyarniy and Yamburgskiy. Gas-condensate and oil-gas-condensate beds at depths of 1600-3400 m are widespread in the Neocomian deposits. The content of ethane in gas is 4-6.5%, of condensate 60-460 g/ m^3 . Working of the Neocomian beds requires their comprehensive development with extraction of ethane and higher methane homologs. Difficulties in developing these beds are associated with the presence of oil margins in a number of fields.

In the European regions, of the total quantity of explored gas reserves of 4.188 trillion m^3 , 3.659 trillion m^3 are ethane-containing and 2.277 trillion m^3 are hydrogen sulfide containing.

In Central Asia, of the total quantity of gas reserves of 3.258 trillion m^3 , 1.580 trillion m^3 are hydrogen sulfide containing.

Gas reserves in the regions of East Siberia and the Far East comprise 3.8% of the national. Increases in gas reserves here are mainly associated with the discovery of ethane-containing gas fields.

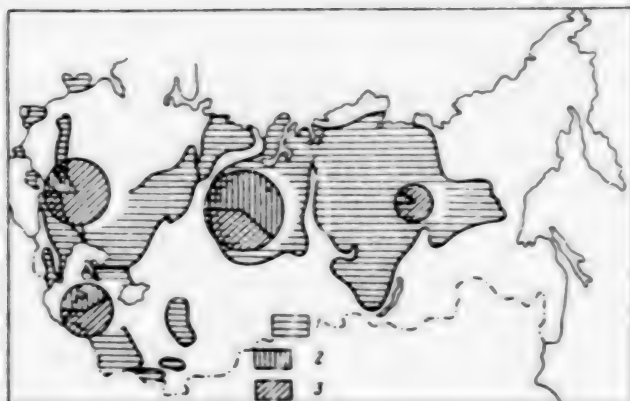


Figure 1. Correlation of Methane and Ethane-Containing Gases in Regions of the Continental Section of the USSR

Key:

1. Oil and gas territories
2. Methane gases ($C_2H_6 < 3\%$)
3. Ethane-containing gases ($C_2H_6 > 3\%$)

The correlation of methane and ethane-containing gases for the country's regions and the distribution of gas resources according to ethane content is presented in figures 1, 2.

The resources of ethane-containing gases and their useful components make it possible to develop a major new subbranch in our country, gas chemistry which is based on refining of natural gas. Natural gas is currently used mainly as fuel. Only a small quantity of it is sent for the production of ammonia and commercial carbon. In the future, the volumes of gas refined at the gas-chemical complexes (GCC) will continually increase.

The most promising regions for the creation of GCC's (according to the data of VNIIGaz [All-Union Scientific Research Institute of Natural Gas]) are the Orenburgskaya Oblast and the adjacent regions of the Ural-Volga area and the Caspian area, northern regions of the Tyumenskaya Oblast, Komi ASSR, Arkhangel'skaya Oblast, East Ukraine, West Uzbekistan, East Siberia, Far East and others.

It is expedient to work the gas-condensate beds on the largest fields of West Siberia with regard for complete refining of the hydrocarbon raw material extracted from the depths. In this respect it is necessary to plan the level of gas and condensate extraction in volumes corresponding to the outputs of the gas-chemical complexes.

At the Orenburg GCC which has become the world's largest in volume of gas refining, a whole chain of production which uses modern processes and highly productive and reliable equipment was developed in a short time. The high profitability of the complex (the outlays for its creation were compensated for in 2 years) is governed by the large scales of production, and also by the fact that in addition to gas, sulfur and gas condensate, the plants in the complex produce a broad fraction of light hydrocarbons and helium. The complex will begin to produce ethane in the near future.

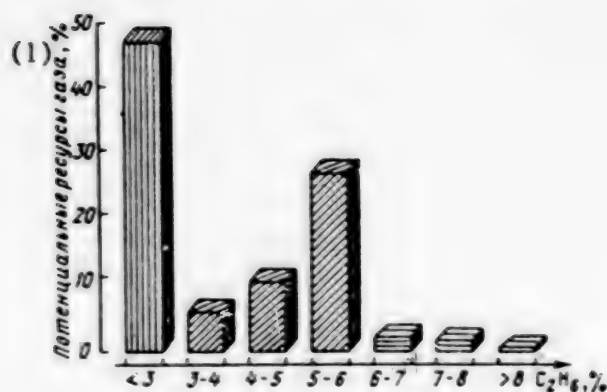


Figure 2. Distribution of Gas Resources according to Ethane Content

Key:

1. Potential gas resources, %

The second gas-chemical complex in Mubarek is also a highly profitable enterprise which manufactures high quality sulfur.

In a technical respect, the process of gas purification from hydrogen sulfide at the Mubarek gas refinery is distinguished by a high degree of saturation of the amine solution (to a quantity of 0.8 moles of acid gases per mole of amine). Because of the increased absorption capacity and other measures, sulfur production was successfully increased to 200,000 T per year. In the near future, production of a new product, liquefied gas, will be set up at the Mubarek gas refinery.

The experience of setting up and operating the Orenburg and Mubarek gas refineries made it possible to start the real planning of development of the unique Astrakhan field.

The country's largest sulfur production will be set up in the new gas-chemical complex already at the stage of experimental-industrial operation. In addition to this product and gas, the complex will produce gas condensate, liquefied gases, and in the future, ethane.

The creation of a developed gas refining subbranch will require high capital outlays. The quantity of capital outlays for production of ethylene from natural gas with an annual ethylene output of 1 million T is estimated at 1 billion rubles. Although the resources invested in gas-chemical production will be compensated for, all measures must be taken to improve the technical and economic efficiency of gas refining.

In the last 10-15 years, new and modern technology has formed in the world practice for separating ethane and the heavier hydrocarbons from natural and casing-head oil gases. This technology is characterized by the use of the method of low temperatures (on the level of minus 100°C) with the production of the cold necessary for the process through gas expansion in a turbine expansion engine. A large number of gas refineries that use turbine expansion engine technology have been built in the world and are successfully operating by early 1981. Their output fluctuates from 1 to 25 million m^3 of gas per day. Certain gas refineries only separate propane and heavier gases, however, in the majority of cases ethane is the product of the cryogen gas refineries.

Domestic gas refining is mainly evolving towards creation of large gas refineries equipped with cryogen units for extracting ethane with output of 3-5 billion m^3 of gas per year. The profitability of these gas refineries can be significantly increased by the use of new technical solutions already at the stage of gas preparation.

Thus, in refining the low-sulfur gas of the Shurtanskiy field, the use of the traditional amine purification of gas from acid components will significantly increase the net cost of the product. Replacement of the amine process with low-energy and capital-intensive oxidizing process of gas purification from hydrogen sulfide with the use of ferric hydroxide will reduce the net cost of refining 1000 m^3 roughly by 1.5 rubles.

The comparatively expensive unit of deep drying of raw material gas on molecular sieves can be excluded from the gas refinery if methanol is fed into the gas stream to prevent hydrate- and ice-formation in the cryogen equipment. Equipment to trap methanol from the hydrocarbon condensate must be developed to increase the economy of this technical solution.

The technical indicators of the most energy-intensive cryogen stage of gas refining also can be significantly improved by searching for and implementing the optimal solutions in planning, as well as in the running of the production units.

Solution to the problem of optimizing the cryogen method of gas refining consists of creating accurate mathematical models of both individual processes and equipment, and the unit as a whole, as well as a developed and flexible system of program support which permits a creative engineer-computer "dialogue."

Another trend of work to extract C_2 and heavier hydrocarbons from natural gas is reduction in the temperature level of gas separation at the NTS field units. Thus, with a separation temperature of -40°C under conditions of the Urengoy field, 20-25% ethane of its potential content can be extracted from the gases of the Valanzhinskiy beds. On the scale of the entire field, this is equivalent to the creation of a gas refinery with output of 10 billion m^3 of gas per year.

The following are the advantages of extracting ethane directly in the field:

the most complete refining of the ethane-containing gases is guaranteed,

the total length of the gas pipelines for the ethane-containing and spent (methane) gases is reduced;

when methane and ethane-containing gases are simultaneously extracted in the field, there is no need to build autonomous gas pipelines;

the total number of production operations is reduced.

Demethanized condensate containing $\text{C}_2\text{-C}_4$ components will be the product of the field ethane units.

The vapor pressure of demethanized condensate is 0.4-0.6 MPA and its transporting on the main condensate pipeline to the GCC does not create technical difficulties.

One of the most complicated problems of creating gas chemistry is coordination of the schedules for development of new fields and schedules for construction of GCC's. An obvious way to solve this problem is to make a developed system of transportation for the hydrocarbons C_2 , C_3 and C_4 which guarantees constant supply of raw material to the GCC from different fields.

By using the systems approach to the problem of the most complete use of the resources of hydrocarbon raw material we can draw a conclusion about the expediency of creating field units to extract the hydrocarbons C_2 , C_3 and C_4 already at the initial stage of development of the field. The C_2 and C_3 fraction obtained on these units in the liquid form can be pumped into the productive bed for its storage until the GCC is started up.

Under certain conditions, the liquid C_2 and C_3 fraction may be used as an effective washing fluid whose pumping into the productive bed increases the bed condensate output.

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CSO: 1822/215

EXPERIENCE IN COMPILING ECONOMIC GEOLOGY MAPS IN KAZAKHSTAN

Moscow RAZVEDKA I OKHRANA NEDR in Russian No 5, May 81 pp 23-26

[Article by O. V. Ivanov and K. Sh. Satybaldin, Geology Ministry of the Kazakh SSR]

[Text] A new direction in economic geology is the cartographic method, used in the systematizing, analysis, storage and representation of geological and socioeconomic information on a graphic base*. The spatial distribution of sources of mineral raw material exerts a decisive influence on the siting of enterprises in the mining and processing industries. For an economic evaluation of the state of the mineral-raw material base of Kazakhstan we have compiled maps of the distribution of the principal deposits and enterprises of the mining industry and have included their technical-economic indices. A cartographic representation of the state of the mineral-raw material base of the republic is necessary in order to predict the probable success of the developing mining industry and is based on the qualitative and quantitative characteristics of the mineral saturation of the subsurface of the republic or individual ore regions, such as the Altay, Central Kazakhstan, Karatau, etc. The primary areas for study and exploitation will be major deposits or groups of deposits which are situated under favorable mining-geological and natural-economic conditions and which are accessible for exploitation.

The end objective of economic evaluation of the mineral-raw material base is a determination of the sequence for bringing the deposits into industrial exploitation and also a determination of the rates and directions of geological exploration work in accordance with national economic plans. Maps of the distribution of the principal deposits and the economic indices plotted on them constitute a graphic model not only of the mineral-raw material base, but also the mineral processing branch. We will examine the method for constructing and maintaining the maps compiled for Kazakhstan. The creation of graphic, factual maps for different types of mineral raw materials supplemented by the necessary economic indices affords a possibility for routine and qualified analysis of the state of the mining and mineral processing branches for any specific time and for the future. The map scale is selected taking into account the problems involved or in relation to the extent of the territories. For example, for maps of the distribution of the principal deposits in Kazakhstan we selected a scale 1:3 000 000 ensuring a normal map load and a good legibility. The regions with the maximum map load (due to the considerable number of deposits and processing enterprises in a relatively small area) were represented in the form of inset maps at larger scales (1:1 000 000, and others). The inset maps were placed in those parts of the map where it was known that no deposits of such a type of raw material had to be represented.

* Gromov, L. V., REGIONAL'NOYE GEOLOGO-EKONOMICHESKOYE KARTIROVANIYE MINERAL'NO - SYR'YEVYKH BAZ (Regional Economic Geology Mapping of Mineral-Raw Material Bases), Moscow, ONTI VIEMS, 1978.

For large regions it is desirable that the maps be compiled at scales 1: 5 000 000-1:3 000 000, whereas for the territory of activity of major combines the scale should be 1:1 000 000 or larger. For the graphic representation of the mineral-raw material base of individual ore regions and the plotting of economic data for mining and mineral processing enterprises it is most convenient to use maps at scales of 1:500 000-1:200 000. These scales make it possible to represent all the deposits existing in a region. On a single map sheet at a scale 1:3 000 000 it is possible to show all the industrial deposits of one or two types of mineral raw material and technical-economic information characterizing the state of the branch, without any additional tabulated data and explanatory notes. The map affords a possibility for a graphic evaluation of the results of geological exploration work directed to ensuring supplies of ore and nonore raw material to the mining and mineral processing industries. A good information yield is achieved because the symbolization has been well worked out. There is no need for an analysis of tabulated and other data for individual deposits and ore regions. An analysis of the maps requires only one composite table which gives the total reserves of ore and nonore raw materials, productivity of ore-enrichment combines and the assurance of all types of supplies (in operation, prepared for operation, explored and reserve) for the republic as a whole.

In evaluating the reserves of mineral raw material and the degree of assurance of ore-enrichment combines with these materials it is necessary to use only comparable data for several years. Then the graphic geological-economic model of the mineral-raw material base of the republic may include not only a set of maps for different metals, but also cartograms, diagrams, etc., placed in the margins of the maps in dependence on the formulated problems. It is most rational to carry out the analysis three-four years or one prior to the formulation of the five-year plan for the development of the national economy. Such an analysis will make it possible to draw a conclusion concerning supplementing or decreasing the reserves in general for the republic or for individual regions during the investigated period, on the necessity for expanding or limiting the volumes of reconnaissance and exploration work for each type of mineral or for an individual mining region. In the analysis it is mandatory to take into account the achieved or proposed capabilities of operating enterprises (mining-metallurgical combine or plant) and possible changes in the need for a particular type of raw material. In compiling the maps the principal sources of information were the balances of reserves and the technical-economic indices for the mining and mineral-processing enterprises. In compiling the maps we collected geological-economic data for 1 January of the current year and classified these data into three major categories: deposits, indices of ore-processing combines and volumes of concentrates delivered to ore-processing and metallurgical enterprises. On the basis of such information a map was compiled, a fragment of which is shown as Fig. 1. On this map it is possible to trace the interrelationship between the Karaganda Metallurgical Combine and the mineral-processing enterprises and sources of mineral raw material prepared by geological prospecting organizations. The data on reserves, the iron contents and the capabilities of mineral-producing enterprises are given in accepted units. For a distinct separation of deposits by groups of metals (ferrous, nonferrous, rare, noble) they are assigned different symbols within a circle (triangle, square, rectangle, rhombus, etc.). The economic indices are given in the form of small tables placed on the map alongside the name of the deposit in which the figures 1-5 denote: ore reserves in the deposit for each type

of mineral raw material, in thousands of tons; reserves of the metal or mineral raw material, in thousands of tons; mean metal content, % or g/ton; proposed and actual capabilities of mineral-enriching enterprises, thousands of tons; assurance of reserves for the proposed and actual capabilities of mineral-enriching combines, years.

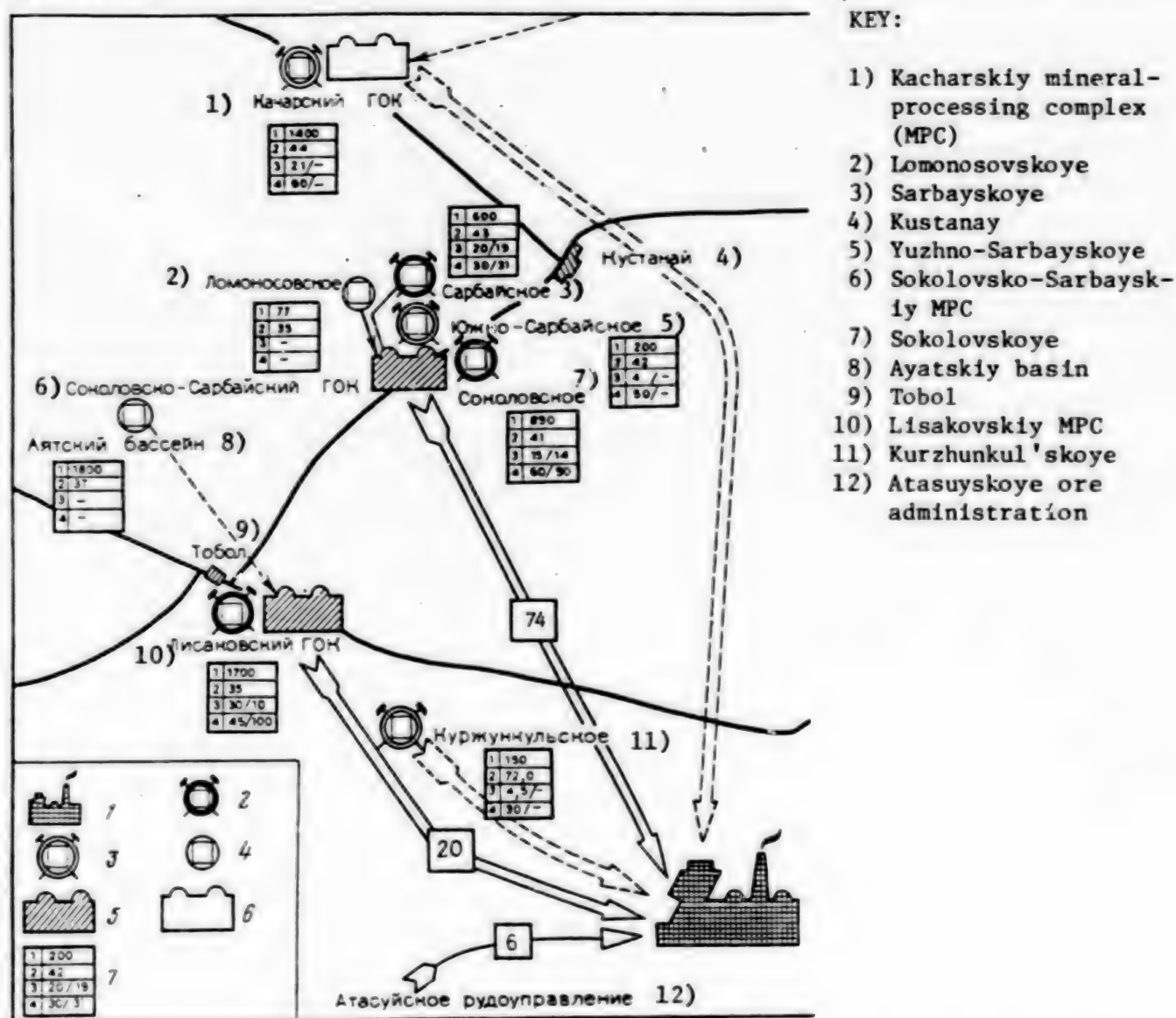


Fig. 1. Fragment of economic geology map for the Kazakh SSR. 1) Karaganda Metallurgical Combine; iron deposits: 2) in operation; 3) prepared for operation; 4) explored and reserve; mineral-enriching combines: 5) operating; 6) planned or in construction; 7) table of technical-economic indices.

Also shown here is the supply of the mining enterprise with technical drinking water, in thousands of cubic meters per day. The tables are typed, photographically reduced and then reproduced in a color variant by the offset method. The color is

selected in dependence on that predominant on the map and must stand out clearly against its background.

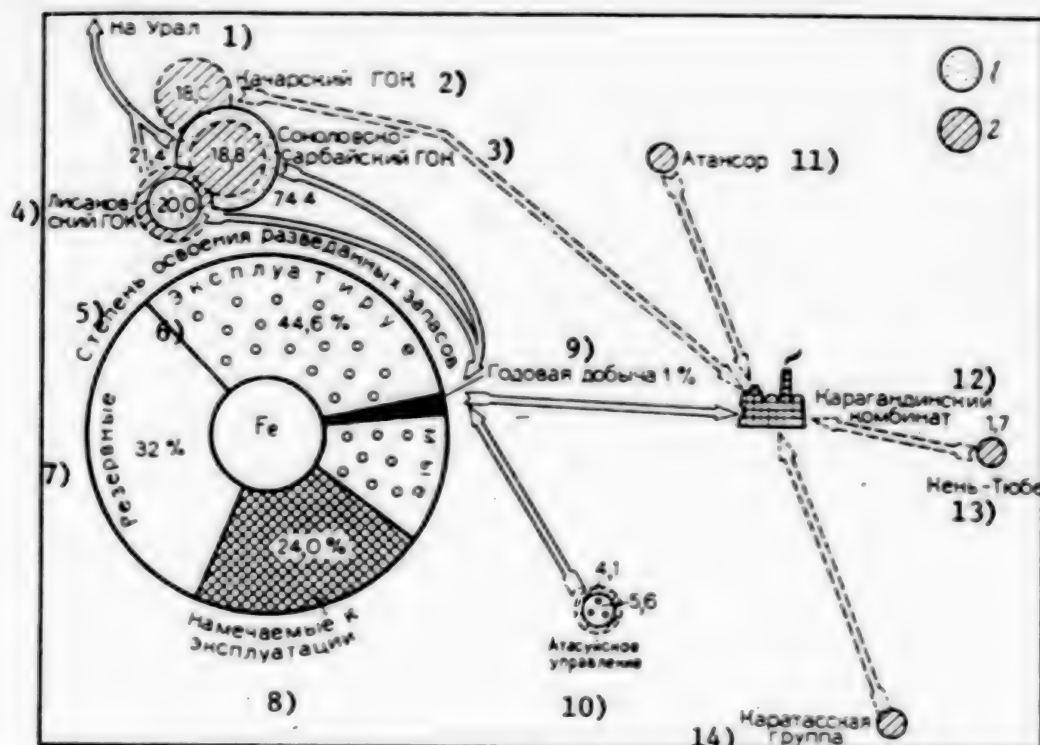


Fig. 2. Principal explored reserves and scheme for the supplying of ore to the Karaganda Metallurgical Combine. Importance of deposit: 1) in production, 2) in total balance of reserves.

KEY:

- 1) To Urals
- 2) Kacharskiy Mineral-Processing Combine
- 3) Sokolovsko-Sarbayaskiy Mineral-Processing Combine
- 4) Lisakovskiy Mineral-Processing Combine
- 5) Degree of exploitation of explored reserves
- 6) Exploited
- 7) Reserve
- 8) Planned for exploitation
- 9) Annual production 1%
- 10) Atasuyskoye Administration
- 11) Atansor
- 12) Karaganda Combine
- 13) Ken'-Tyube
- 14) Karatasskaya Group

The supplying of concentrates by the mineral-processing combines to the metallurgical enterprises is represented by the lines connecting the suppliers with the plants. The double lines represent the principal suppliers and the single lines represent additional suppliers; the dashed lines represent future suppliers and

the dotted lines -- interrepublic suppliers, etc. The figures in the squares situated on these lines designate the percentage of the supply relative to the annual plan of the enterprise. Thus, the map shows the spheres of activity of mineral-enrichment and mining-metallurgical combines. In the case of supply of concentrates by one mineral-processing combine to two or more plants the lines are drawn in different colors corresponding to the color of the notations of the mining-metallurgical combines or the plants. A cartographic representation of the mineral-raw material base of the republic makes possible the routine revision of map content and an analysis of the movement of balance reserves, taking into account the productivity of the user for a definite year or a long-range period, regulating the volume and refining directions for geological prospecting work in any mining region. Figure 2 shows the degree of exploitation of the explored reserves and a scheme for the supplying of ore to the Karaganda Metallurgical Combine. This diagram shows how the reserves are exploited, from what deposits the ore is received by the plant and in what quantity, the role of each deposit in the total balance of reserves, the participation of each mineral-processing combine in the total output, what deposits are in operation and which are in reserve. The areas of the circles correspond to the scale of a particular deposit or mineral-processing combine. In order to increase considerably the load on such economic geology maps and the representation of complex indices and interrelationships on them, in Kazakhstan work has been initiated on the development of an automated system for the compilation of such maps using a YeS-1050 electronic computer.

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FUELS

METHODS, EQUIPMENT FOR IMPROVING CASPIAN OFFSHORE OIL, GAS RECOVERY TOLD

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 6, Jun 81 pp 1-3

[Article by K. A. Abasov, chief of the VPO Kasporneftegazprom: "Ways to Develop Azerbaijan's Offshore Oil and Gas Recovery During the 11th Five-Year Plan"]

[Text] The Soviet Union has at its disposal vast areas of continental shelf in internal and bordering seas at which substantial oil and gas resources have been concentrated. The development of these areas is a most important national-economic task in augmentation of the country's fuel and power potential. Because of this the VPO Kasporneftegazprom [All-Union Caspian Sea Oil and Gas Production Association] did a great amount of prospecting and exploratory work on the eastern and western shelves of the Caspian during the 10th Five-Year Plan. Prospecting for new and the exploration of discovered deposits continued in the sediments of Middle Pliocene age in areas of the Apsheron and Baku archipelagoes. the eastern part of the Apsheron-Balkhany sill and the South Turkmen shelf. Moreover, a small amount of prospecting and exploration was done for oil and gas in Mesozoic and Jurassic sediments, on the Kazakh shelf (in the Aralda offshore, the Rakushechnaya trap and the Rakushechnaya offshore areas), in Mesozoic and partially in Miocene-Oligocene sediments in the Apsheron Bay and Sangachaly offshore areas, and in other places. As a result, four oil and gas fields were opened up, and five deposits of oil and one of gas condensate were found.

The oilfield imeni 28 April', which is located in the Apsheron-Balkhany tectonic zone, 15 kilometers from the Neftyanyye Kamni field, was opened up during the 10th Five-Year Plan. In the area where the field is located, the seawater depth varies from 80 meters (in the western part) to 200 meters (in the eastern part). For the first time in domestic practice, the design and erection of a deepwater stationary platform for 84-meter sea depths enabled this highly productive field to be opened up.

Definite successes were achieved also at the Baku Archipelago, where the boundaries of petroliferousness of horizons 7 and 8 at the Sangachaly offshore, Duvanny offshore, Bula Island and Bulla offshore fields were enlarged, and prospecting for oil and gas deposits was conducted in the PK suite.

The oil and gas fields imeni Barinov and the Cheleken dome, which are located in the eastern part of the Apsheron-Balkhany tectonic zone, where industrial flows of oil and gas were obtained from members 7 and 8 of the redbed series, were opened up in the Turkmen sector.

An analysis of the results of prospecting and exploration indicates that the main distinctive feature during the 10th Five-Year Plan was a substantial increase in well and sea depths. The average depth of drilling in 1980 for prospecting and exploration wells was 5,253 meters and of the sea (in the area where the structures were located) was 60-85 meters. This testifies to the fact that in practice, prospecting and exploration for oil and gas in the Caspian are entering the second period, a more complicated one. Prospecting and exploration tactics must be restructured and changed as quickly as possible, that is, the techniques and technology for the design and construction of hydraulic-engineering and oilfield structures, the inventory of drilling and floating equipment, the technology of testing and operating superdeep oil and gas-condensate wells, and so on, must be improved.

It should be noted that definite work has already been done in this area. Thus, stationary platform No 2 at the oilfield imeni 28 April' is being assembled and installed at a sea depth of 110 meters for drilling 10 exploration and production wells. A plant for fabricating support units for deepwater stationary platforms that will have a capacity of 70,000 tons of metal structure per year, which will enable offshore oil and gas field facilities to be built up in sea areas with a depth of 100 meters or more of water, is being constructed at an intensified pace. The inventory of the offshore fleet is being augmented by new floating equipment, erecting ships and floating drill rigs (PPBU-6500/200 and SPBU-6,000/60), which will support the drilling of prospecting and exploration wells up to 6,500 meters deep in waters 60-200 meters deep, by ships for laying large-diameter underwater pipelines (the "imeni S. A. Bezirov"), by various geophysical and research ships (the "Ali Amirov" and "Suleyman Bagirov"), and by craneships with load-lifting capacities of 250-2,500 tons (the "Kerogly" and the "Azerbaydzhan").

Great hopes are being placed on floating drill rigs during the 11th Five-Year Plan. A high degree of autonomy, more improved equipment, and completeness of the mechanization of equipment, with rational organization of work, are helping in the achievement of high technical and economic indicators when wells are drilled from these installations. The indicators for the drilling of prospecting wells (net effective speed, utilization of the time available, and so on) that are actually achieved by floating drill rigs are more than those achieved by drilling from stationary platforms.

Definite successes were noted in the area of the techniques of and the technology for the operation of superdeep oil and gas-condensate wells during the past period. New systems for well-head connections at high-pressure and high-flow rate wells ($p_g = 30-35$ MPa, $Q_p = 800,000-1$ million cubic meters per day), modular operating installations (BT-64 and BT-100) for the separation and transporting of the wells' product to the head structures (GZU's), in-well equipment that provides for safe operation, rational schemes for the buildup of oilfield facilities, systems for treating and transporting gas, and so on, have been developed and introduced at oilfield facilities. Much work has been done to support the internal transport of the ever-increasing amounts of gas recovered.

The Bulla offshore-Dashgil' (fourth strand), the Bakhar-GSP Gousany (sixth and seventh strands) and the Lake Zhiloy-Neftyanyye Kamni gas pipelines, gaslift compressor station No 5 at the NGDU [Oil and Gas Recovery Administration] imeni N. Narimanov, the first phase of the Dashgil'-Azerbaijan GPZ [gas treatment plant], and other facilities have been put into operation.

Definite successes were also achieved in the area of the development of oil and oil-and-gas condensate fields, which will enable the state plan for oil and gas recovery to be fulfilled.

In 1980 the drop in recovery of oil was greatly reduced, and the amount of gas recovery reached the level that was planned for the end of the 11th Five-Year Plan. All this was achieved thanks to the selfless work of the whole collective of offshore oilfield workers, who provided a set of measures for improving systems for developing oilfields and for introducing various progressive methods for the artificial stimulation of deposits, with a view to raising their withdrawal. A large number of geological engineering measures was executed, 178,000 meters of production hole were drilled, and 85 wells were put into operation.

Suffice it to say that out of 15 oil and oil-and-gas condensate fields, 6 are being worked with the formation pressure maintained by the injection of purified seawater and connate water. About 2.7 million additional tons of oil were obtained through water stimulation in 1980, 14.4 million cubic meters of water having been pumped into the deposits.

High technical and economic indicators were achieved during development of the Neft-yanyye Kamni field, where deposits were subjected from the very start to water stimulation. Suffice it to say that, of the oil that has been taken from the field during the whole development period, 105 million tons were recovered by the inexpensive gusher method. For most of the field's deposits, high recovery factors, which approach 0.7-0.8, have been achieved. Certain industrial-test operations were also performed in regard to introducing physico-chemical and thermal stimulation at deposits being developed, with a view to making maximum withdrawal from the reserves, especially at old fields. Positive results were obtained at the Lake Artem field from thermal stimulation of the KS and PK deposits by creating an in-situ combustion front, and at the Sangachaly offshore-Duvannye offshore-Lake Bulla field by injecting PAV's [surfactants]. About 75,000 additional tons of crude were obtained by taking these measures.

Methods for developing oil and gas recovery in the Caspian during the 11th Five-Year Plan were determined by "The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990." In order to provide for fulfillment of the tasks that have been set, VPO Kasporneftegazprom must solve the following questions:

in the area of prospecting for new fields--concentrate the main amount of work on the more promising sections of deepwater parts of the Caspian, using floating drill rigs;

in the area of well drilling--improve the organization and technology of drilling deep wells, reduce the duration of the construction cycle thereof, greatly reduce the number of accidents and the amount of organizational-type idle time, and introduce highly productive rock-destroying tools, chemical reactants and additives into operation on a large scale;

in the area of the techniques for and technology of well operation--expand use of the inexpensive gaslift method by using gaslift valves and high-pressure gas of gas-condensate horizons, create and introduce a well-head complex in an underwater

version, further improve systems for building up offshore oilfield facilities and systems for treating and transporting gas, and so on;

in the area of developing oil and gas fields--improve systems for developing old fields by stimulating them with new progressive methods that promote maximum use of their reserves and with the introduction of new fields into industrial-test operation; and

in the area of the construction of hydraulic-engineering structures--unify construction work, for example, the construction of dismountable, stationary platforms for the drilling and operation of wells, approve the production of offshore versions of equipment and of automated box modules for drilling and operating wells and for gathering, treating and transporting the products thereof and of technical means for reliable power supply and communications, and so on.

The Caspian's oilfield workers are filled with resolve to direct all their efforts, knowledge and enthusiasm toward solving the tasks of further stabilizing and increasing the offshore recovery of oil and gas that the historic 26th CPSU Congress established.

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CSO: 1822/213

FUELS

SHIPS FOR CASPIAN OILFIELDS NOT GETTING PROPER REPAIR SUPPORT

Ashkhabad TURKMENSKAYA ISKRA in Russian 19 Jul 81 p 2

[Article by Yu. Smetanin, secretary of the Party Bureau of the Eastern Regional Administration of the Offshore Oil and Gas Fleet: "A Yard or Repair Shops?"]

[Text] An intensification of exploration for and recovery of liquid fuel at the Cheleken area of the Caspian Sea requires regular supply of the offshore underground explorers with all that is necessary. This obligation was vested in the crews of the Eastern Regional Administration for the Offshore Oil and Gas Fleet.

As oil and gas field facilities on the Gubkin, LAM, Zhdanov and other banks have developed, our fleet has matured quantitatively and qualitatively. Instead of physically worn and obsolete ships, crane and passenger ships with more powerful engines, automatic control systems and modern electronic navigation instruments have been arriving at the Cheleken docks. The reliability, stability and comfort afforded by the ships have been increased.

The new equipment required skill in navigating motorships in the complicated environment of the eastern Caspian. And the sailors have striven to meet this requirement. The administration's collective has repeatedly emerged as the winner in socialist competition among transport and communications enterprises of Krasnovodskaya Oblast. The haulage program was carried out ahead of time in the first half of 1981. The crews of the crane ships "Valeriy Rylov" and "Melik Geokchayev" and the seagoing tug "Stepan Shaumyan," where the production innovators' movement and instructorship have been widely developed and socialist competition has been organized, are working especially well.

But each year the sailors' successes are achieved with increasing difficulty, and it is increasingly harder to provide for the timely departure of ships for sea. The main cause is the lack of a strong repair base. Prior to 1979 the only place where the oilfield fleet was repaired was the Shipyard imeni Frunze in Krasnovodsk. It was subordinated to the Caspian Maritime Shipping Line of the Ministry of Maritime Fleet.

At the start of the 1970's, when active drilling-over of geological structures in the Cheleken area of the Caspian commenced, the decision was adopted to build a ship-repair enterprise at Krasnovodsk. KaspornIIproyekt developed documentation and performed the required surveys. Turkmen SSR Minstroy [Ministry of Construction] approved the design.

However, the construction project still has not been executed. They explained this by its expensiveness. It was decided to take the route of expanding the existing yard. Ministry of Maritime Fleet planned to erect here a boiler-welding department and a floating dock and to assign a reserve anchorage to it. Reconstruction was extremely necessary because the collective of the enterprise was coping still less and still worse with its commitments to repair ships. It was held back by a lack of production space, by equipment that was obsolete and low in capacity, and by a lagging technology.

But instead of reequipping, as had been intended, in February 1979 the yard, in accordance with an order of the Ministry of Maritime Fleet, was reorganized into machinery repair shops of the Krasnovodsk Maritime Commercial Port. The yard had become not a yard, only a subsidiary operation. Thus Minmorflot [Ministry of Maritime Fleet] and the Caspian Shipping Line "got rid" of an enterprise that had been lagging and chronically did not fulfill its plan and of the bother of rebuilding. But they thereby put the sailors of the offshore oilfield fleet, fishermen and others in a most difficult position.

The port's managers are now using their repair shops for narrow in-house purposes and are not concerning themselves with the repair of ships that operate for the national economy. For example, barge No 10, which has not been in operation for a long time and is in an unsatisfactory state, has been standing in the big dock since January. The port repairs it through the rationalizers' activity. The introduction of rationalizers' suggestions promises no few advantages to the workers of the commercial port, and that is why a large number of people have been busy on the barge and materials and funds are sent there. At the same time, our fleet is deprived of the opportunity to renovate the ship, which is in need of urgent repair.

The ship-repair requirement for 1981 just of the Eastern Regional Administration comes to 800,000 rubles, in monetary terms, and by the end of the five-year plan it will grow to 1.37 million rubles. How do the repair shops help the sailors? Last year we announced 12 ships for repair with a total of 196,000 rubles' worth of work. Actually, 4 ships were repaired, at a cost of 91,000 rubles, one of them having been "registered" at the repair shops since 1979.

This year we have to renovate 9 ships and to spend more than 311,000 rubles for this purpose. The same Caspian Shipping Line has allocated us a ceiling of 140,000 rubles' worth of work. Two ships have actually been accepted for repair, and in half a year barely more than 10,000 rubles have been assimilated. But even this miserly figure costs us in labor and nerves. The ships were sent for repair in accordance with a personal understanding with chief of the workshops, Ya. Kh. Khamidulin, who operates on the principle of "my hand is the master." Paperwork is accepted only for profitable types of work. Ships can be arbitrarily held in repair, and frequently they lie idle for much longer than the standard period.

We cannot concur with the Deputy USSR Minister of Maritime Fleet B. A. Yunitsyn, who justifies reorganization of the yard into workshops. In 1979, writes Comrade Yunitsyn, the volume of services extended to the Turkmenistan economy was 674,000 rubles, which was higher than the previous indicators. The result of such a "growth" was this: today 11 of our ships do not have authority to sail. Not one of the floating cranes can be sent from Cheleken to Baku and Krasnovodsk to deliver equipment and materials for exploratory or operational drilling; this slows progress in prospecting for and recovering offshore oil.

We have repeatedly appealed to various authorities with a request and recommendations to reestablish the ship-repair yard at Krasnovodsk and its former subordination. The USSR Ministry of Gas Industry reported that in 1981 the Eastern Regional Administration will be allocated a floating workshop. But the latest measure does not solve the problem. True, it will facilitate somewhat the conduct of navigational repair during the operating period, but the situation with respect to overhauls will remain complicated, as before.

There is only one way out, we repeat, and that is to reestablish and expand the ship-repair yard or to build a new one. Without it, the oil and gas field fleet will find itself in a fix, and, along with us, the explorers of the offshore regions. We understand that it is impossible to put up a yard in one year. But still administrative, design and supply and equipment questions can be decided, and right now it is necessary to impose strict order in the work of the machinery repair shops, to preclude the division of work into the profitable and unprofitable. The machinery repair shops have been specialized primarily in the repair of ships, and diversion of the collective to other jobs that are profitable only for the port must be stopped.

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FUELS

OIL FOUND IN AZERBAIJAN'S KURA DEPRESSION

Baku VYSHKA in Russian 28 Jul 81 p 2

[Article by V. Gol'tsev: "There Is Oil in Zardob"]

[Text] The fuel of a new oilfield is going into the tanks of the NGDU [oil and gas recovery administration].

As has already been reported in VYSHKA, in April of this year a powerful but, it is true, short-lived oil gusher was obtained at the new Zardob exploration site during sampling by a formation tester at prospecting well No 3, which had been drilled. According to a preliminary assessment, its flow rate was hundreds of cubic meters of liquid fuel per day.

It has become clear: there is oil in Zardob! The good news stimulated much labor enthusiasm on the part of brigades of the Gobustan Exploratory Drilling Administration, which is prospecting for rich oil and gas deposits in structures of the Middle Kura depression.

And here is a new labor success. The first exploratory well, No 4, went into operation at the end of last week at the Zardob site. It was drilled with good technical and economic indicators by the brigade of drilling foremen Agigat Aliyev and Sayad Mamedov to a depth of 4,715 meters, down to the opening up of Upper Cretaceous and Eocene sediments, from which a flow of oil was obtained during tests of the formation. Now the new well is giving 35-40 tons of liquid fuel per day through a 9-mm flow regulator.

Following that, well No 7, which had been drilled into this same structure by the brigade of foremen Abdulaga Samedov and Sadretdin Bayramov, also gave a flow of industrial oil. It is operating with a flow of up to 15 tons of clean crude oil per day.

Both wells are included in the inventory of NGDU Muradkhanlyneft' [Muradkhanly Oil Recovery Association], where work on a study of them has started, the results of which will help oilfield personnel to establish more optimal regimes for operating them.

In commenting on this event, chief of the geological section of Azneft' [Azerbaijan Oil Recovery Administration] Guseyn Muslimovich Farzaliyev said:

"First of all, the new wells confirm the forecasts of geologists about the presence of storehouses of natural fuel in Azerbaijan's central regions, where the Zardob site is located. The prospects here are good. But we still have much to do. Further exploration should clarify the outline of petroliferousness and the shape and size of the deposit and refine the potential of the productive object. The penetration of well No 9, with a designed depth of 5,500 meters, began here recently. Drill rig No 8 is being erected at full speed, but at the next one there is still only a 'spot.' Three rigs are operating, but in the future, as new data are obtained, the amount of work will be expanded. In brief, we have taken the first steps in assimilation of this region's Eocene sediments, which were being developed in Eastern Georgia several years ago. And there is no doubt that the explorers of the earth's depths will achieve new labor successes."

11409

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FUELS

RECENT PROGRESS AT SAMOTLOR OILFIELD SUMMARIZED

Baku VYSHKA in Russian 28 Jul 81 p 2

[Article by TASS (Nizhnevartovsk, Tyumenskaya Oblast): "Samotlor's Billionth"]

[Text] The billionth ton of crude has been recovered at Samotlor. This much fuel has been obtained in little more than 12 years of development.

The openwork summit of an oil well is visible where the road leads to the lake. This is the first production well at the field, which gave the start to a deep river of oil. It is now reliably serving the people. And there is no harm in the fact that constructing the well took a long time--2 months. Experience was then being acquired in assimilating a field so difficult of access.

In a short time automated oilfields rose up on the swamps and in the lake, electric power lines have stretched out, and high-capacity oil pipelines have connected the field with the country's industrial centers. It became a testing ground, where under the severe environment of the Middle Ob', the boldest engineering decisions underwent tests for soundness.

This year the Tyumen' oilfield workers decided to use actively Samotlor's experience in mastering new fields. And the country's main oilfield itself continues to increase recovery of the valuable raw material. Since the start of the year the Samotlorians have drilled about 80,000 meters of underground hole above the plan. Wells are being built on man-made islands. The regulating service for maintaining formation pressure is literally giving much. The essence of its progressive method consists in pumping water under high pressure into the producing formation, thereby displacing the crude.

The start of the five-year plan was characterized by an increase in quality of the product delivered by the oilfield's workers. And a plant built here recently has enabled casing-head gas to be treated. Formerly it was burned off in a flare, but now the Surgutskaya GRES and East Siberian enterprises are operating on it.

Following the example of Samotlor's oilfield workers, all the subunits of Glavtyumenneftegaz [Main Administration of the Oil and Gas Industry of Tyumenskaya Oblast] are recovering fuel at an outstripping pace. Since the start of the year the Tyumeners have already obtained more than 900,000 tons of raw material above the plan.

11409

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FUELS

SUCCESS OF NAGORNAYA COAL MINE EXPLAINED

Moscow SOVETSKAYA ROSSIYA in Russian 18 Jul 81 p 2

[Article by A. Trutnev: "Luck, No Calculation!"]

[Text] The "Nagornaya" mine is operating stably. Not every mining collective can achieve this: addition to the plan every month, and addition to the production facilities every year. The success of the enterprise is especially graphic on the background of the latest failures of the Kuznetsk miners. The basin has not fulfilled the plan for 3 years. Last year the extraction level even dropped. What is the matter? The specialists believe that the rated outputs at many coal enterprises have long been exaggerated and reconstruction is delayed. Moreover, not a single new mine has been made in the Kemerovskaya Oblast for 20 years now. This is why the stable growth of "Nagornaya" attracts special attention.

I recall how 5 years ago we spoke of difficulties of the Kuznetsk coal miners with the director of "Nagornaya," V. M. Yerpylev. He did not hide that he feared serious troubles in the basin.

"There is little hope in the mine builders," Viktor Mikhaylovich said excitedly. "Their forces are scattered and a lot has to be built and rebuilt. And we will hardly have a sufficient number of new treatment complexes."

I will not hide that in that first meeting, Yerpylev seemed to be a typical "objectivist," one of those, alas numerous leaders prone to explain any failure by objective reasons. Their logic is simple: "Give me everything necessary, then there will be products."

What can you say? In fact, if the planned volume of production is not completely supported with equipment, materials and a work force, then there is nothing to argue about. According to the calculations of the specialists, for example, in Kuzbass on the average in a month no less than 10 prepared faces are idle because there is nothing to equip them with. How can the extraction be increased?

The collective of "Nagornaya" which produced 1.807 million tons of coal in 1976, ended the 10th Five-Year Plan with an annual output of 2.119 million tons. A solid increase! The mine was awarded the Order of the Red Banner of Labor. Its director V. M. Yerpylev was awarded the title of Hero of Socialist Labor. We recently met again. I recalled that long ago conversation.

"If you sit with arms folded, you will not have coal," Yerpylev noted.

Some now say that "Nagornaya" was lucky, that it is on convenient beds and therefore the mining-geological conditions do not assign its specialists puzzling production tasks. I imprudently said this to Viktor Mikhaylovich. He was insulted, although he made no sign. He answered curtly:

"I know about these conversations. Some people have forgotten the simple truth, that we, the engineers, create the conditions."

Practice has many times allowed us to be convinced of the correctness of his words. Take the sections with increased mining pressure. They are found in almost every mine, at times forcing the miners to switch to other faces, leave the coal, and sometimes the equipment. Losses of extraction for this reason are high are on the whole for Kuzbass. An objective reason? It would seem. At "Nagornaya," the brigade of R. N. Stakheyev was once given a section with increased pressure. The mine specialists adopted an original solution: rapidly install a second combine in the longwall and work the difficult face quickly with two brigades. Don't think that they recklessly leaped into the fire here, risking an accident. Accidents were eliminated.

"We the mining engineers must consider everything in advance. We have to see the possible troubles and prevent them," Yerpylev commented on this case.

Consider everything. Perhaps there is no better way to explain the success of the enterprise. The calculations touch upon not only the extraction conditions, but also the organization of all links of production. Say that the mine now only has three extracting brigades, while at one time there were seven, and they produced less coal. What is the essence here? Previously it was necessary to prepare seven faces and seven mechanized complexes. And there were not enough of them it was said. The mine came to the conclusion that the number of brigades could and should be reduced. Then they will become valuable and will have the equipment and materials. Now the annual load of all three brigades is very high, 600,000 - 700,000 tons of coal each. There are only about 20 of these collectives in all of Kuzbass. The monthly output per miner, and this is the most objective indicator, is one of the highest in the basin.

Perhaps the stability of work in the mine, as nowhere to a greater degree, depends on the ability of the leaders to see the future. The reserves of the coal ready for extraction have to be continually renewed. What can be done when the mine builders do not succeed in doing the reconstruction? At "Nagornaya" they have been doing the renewal with their own forces for several years. Perhaps this is the correct solution in this situation, otherwise the objective difficulties will win out. The first coal will thus come from the new faces at the end of this year. It is even more remarkable that after taking up the burden of additional work, the miners not only did not diminish the output of fuel, but continued to increase it.

I think that all of these examples convincingly indicate the high responsibility of the collective and the creative mood of the specialists and the enterprise. The calculations concern the mine workers. For example, the brigade headed by delegate to the 26th Party Congress R. N. Stakheyev extracted 1.5 million tons of fuel without major repair of the mechanized complex. The machines, the most typical there are, served almost three periods here. Other sections use the equipment just as skilfully and prudently. Perhaps because the entire mine has enough equipment?

Or another detail: I saw a metal box in the "stock" of the brigade of Hero of Socialist Labor A. F. Nikitin. What is its purpose? "We collect bolts and screws," I was explained. "They fit in another longwall." Often in other mines scarce hardware is left in the worked faces. They say that they did not succeed in taking them out.

This is the style of work of the entire collective headed by V. M. Yerbylev. This style is manifest in the great and small as thrifty economy, farsightedness, reinforced by accurate calculation and the ability not to lose sight of the future growth in today's concerns. It must be confessed that this continuity is not achieved everywhere. Perhaps the mine "Yubileynaya" is a fairly graphic confirmation of this.

Both enterprises are subordinate to the production association "Gidrougol'." The working conditions are the same to a certain measure. Moreover, "Nagornaya" is just planning to switch to the hydraulic method of extraction, while its neighbor has been using it for many years. If you consider that this method is considered more effective than the "dry" technology, then it turns out that "Yubileynaya" must be ahead in all indicators. Alas, you cannot say that today.

We conversed with the director of the mine A. A. Atrushkevich about the plans for the 11th Five-Year Plan. Al'bert Anisimovich explains:

"The main goal of the collective is to maintain the attained level of extraction."

What level? The level of the beginning of the 10th Five-Year Plan, or the level at the end of it, 100,000 tons lower? It turns out that now the specialists of the mine see the primary task as not reducing the coal extraction even further.

How is this so? Some plan an increase, while for others it is impossible for the entire 11th Five-Year Plan. Why? The informants explain that in its time the mine ran ahead with the level of extraction. The ministry without grounds assigned to the enterprise more production output than in actuality, and now they make no headway.

Is the whole problem the miscalculations of the ministry? No, there is another reason.

If someone had decided to predict the current decline 4 years ago, the "seer" would simply have scoffed. The situation seemed very stable. The extracting collectives at "Yubileynaya" set record after record. Precisely here, Hero of Socialist Labor G. N. Smirnov's brigade for the first time in the country was able to produce a million tons of coal per year. Then another two "million-producers" appeared in the mine, the collectives of Hero of Socialist Labor Ye. S. Musokhranov and R. Kh. Mingulov. In 1977 all three brigades simultaneously extracted a million each. The decline in extraction began the next year.

Perhaps the whole problem lies in the exceptionally difficult working conditions? Or some other unexpected circumstances? No, nothing extraordinary occurred here. Gross miscalculations did not permit the enterprise to develop normally. The brigades of million-producers actually toiled selflessly, with the maximum output. It is no fault of the workers that the mine became feverish. I often had the

occasion to visit these famous brigades and to see the enthusiasm with which the miners reached new heights. Thus, they were quite deserving of their awards. But even then, at the height of success, G. N. Smirnov and his colleagues were disturbed by the abnormal situation that had begun to develop in the mine. I recall a conversation with the brigade foremen in the office of the then director of "Yubileynaya" I. N. Bogdanov. He and other leaders, it appears, did not expect that turn that the conversation took. In the first place, the brigade foremen were concerned with the lack of smoothness of the work: one month a lot, the next nothing.

It turned out that the mine had been especially assigned the goal of having several million-producers at any price. The record level of extraction was reached on "lucrative" beds convenient for extraction. And they became fewer. The thin beds should have been worked at the same time. But neither the mine specialists nor the scientists of the curator institute VNIIGidrougol' [All-Union Scientific Research and Planning Design Institute of Coal Extraction by the Hydraulic Method] were able to determine in time how to do this without significantly reducing extraction. Moreover, they overlooked the long-term problems altogether. Now everyone admits that reconstruction of "Yubileynaya" was thoroughly delayed.

No matter how strange it sounds, the mine reached an impasse precisely by chasing after "millions." All efforts and resources were given to this goal, although the farsighted leader is obliged to foresee and guarantee that "apportionment" so that reserves of coal, equipment and enthusiasm are always in sufficient supply. All the conditions, both engineering forces, and the experience of the leading workers, were present for prudent management of extraction. A distinct plan for organization of work was developed for the brigade of G. N. Smirnov and the specialists of the mine and VNIIGidrougol' made detailed calculations of each operation, keeping in mind not only the record itself, but also its economic expediency. But this practice was not repeated. In other collectives, effective engineering solutions were replaced in many cases by a simple increase in the quantity of equipment and the number of workers. This is shown by a comparison of the technical and economic indicators. The brigade of G. N. Smirnov had 70 people, while others had 120-130. The first had an output per man of 1200-1400 tons per month, while the others had less than a thousand tons.

Of course there is no reason to doubt the record extraction. But most likely, after once achieving the "million" level, it is natural to maintain it in the future if the record occurred as a result of well-thought out measures which guaranteed a rise in labor productivity. Today there are nine stoping brigades at "Yubileynaya" and their load is extremely variegated: from 800,000 tons to 117,000, and this is the miserly indicator of the former collective of million-producers.

The conditions of "Nagornaya" also make it possible to organize the work so that some brigade becomes a million-producer. I think that V. M. Yerpylev consciously does not follow this course in the name of smooth, stable operation of the entire collective. Life confirms his correctness. No matter how we compare the work of the two mines, almost everything speaks against "Yubileynaya": the level of leadership and activity of the specialists, the use of equipment, the number of workers and their output.

It happens, however, that today there is no one to ask about the failure for A. A. Atrushkevich has only been the director for several months. Since the

beginning of the decline, the leadership of the mine has changed three times. But there is the association "Gidrougol'." Its general director A. Ye. Gontov headed "Yubileynaya" in the period of its great glory.

These two mines to a certain measure show two approaches, two methods of management. One results in stability and permits advances upwards, step by step. The other produced a flash of productivity, which alas is now extinguishing.

9035

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FUELS

ACCELERATED DEVELOPMENT OF KANSK-ACHINSK COAL URGED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 Jul 81 p 1

[Article by V. Zubkov, our special correspondent: "Order for Harmony: Accelerate the Use of Inexpensive Kansk-Achinsk Coal"]

[Text] "We have no alternative to KATEK [Kansk-Achinsk Fuel and Energy Complex]"; stressed the director of the Institute of Economics and Organization of Industrial Production of the Siberian Department of the USSR Academy of Sciences, Academician A. Aganbegyan in his speech. "The main portion of the oil and gas in West Siberia will go to the European sector of the country in future years. Extraction of fuel here has diminished in recent years, while demands have risen. There remains coal, of which we have enormous reserves. But Siberia will be in a very serious situation if we wait to develop KATEK, the Kansk-Achinsk fuel and energy complex even for 2 to 3 years. Now only 5% of the estimated cost of the complex has been assimilated. We need a radical change in the consciousness of the people who are responsible for creating it. Otherwise we will not fulfill the assignment on schedule."

These words were heard from the podium of the scientific-practical conference "Equipment and Technology of KATEK in Light of the Decisions of the 26th CPSU Congress" which was held on the initiative of the Krasnoyarsk party kraykom. Scientists, specialists, party workers and leaders of ministries and departments gathered at it in direct proximity to the giant coal basin in order to discuss the problems and outlook for its development. The main purpose was to try to face the most acute questions that are slowing down the formation of the complex. These questions, to put it bluntly, are not the simplest.

Nature has disposed of its resources fairly uniquely here. The coal belt of KATEK roughly on the Krasnoyarsk level covers the south of the kray and enters the Kemerovskaya and Irkutskaya Oblasts. At a comparatively shallow depth, to 350 meters meters, the thickest beds are found with average thickness of 50, and at times even almost 100 meters. The geological reserves of coal in the Kansk-Achinsk basin total roughly 600 billion tons.

But nature does not given anything so simply. The coal of this field has a high water content, while the caloricity, as in all lignite, is low. It is therefore not profitable to ship it great distances. For this and a number of other reasons, it was decided to process it on the spot, first of all into electricity at the thermoelectric power stations.

Correspondingly, the Main Directions adopted by the 26th Party Congress also defined the main questions in the creation of KATEK: "Put into operation the first phases of the Berezovskiy coal open pit No 1 and the Krasnoyarsk plant of heavy excavators, and the facilities at the Berezovskiy GRES No 1." In other words, a single chain is being set up: the machine builders provide the coal miners with new and powerful extracting equipment, while the coal miners supply the GRES with fuel. The GRES is equal in power to the Sayno-Shushenskiy giant, 6.4 million kilowatts.

This is the near future. What is the situation today? Judging from the speeches at the conference, the starting point of the complex, coal extraction, causes the greatest concern in many.

It is clear that no one is planning to strain fuel by drops from the giant storehouse. Two open pits are in operation here: Irsha-Borodinskiy with rated output of 25 million tons and Nazarovskiy with 16 million tons per year. But now roughly 35 million tons are extracted from them per year. The superthick Berezovskiy open pit No 1 should yield 55 million tons per year. This is over 18,000 loads of coal per year, or in other words, 2 loads per hour.

In order to guarantee this output, the most progressive technological solutions based on continually operating equipment have been included in the plan for the open pit. It is headed by the rotary complex ERP-5250 with hourly output of 5,250 cubic meters. The belt conveyers, powerful loaders and swing chutes will guarantee transporting of the stripped rock along the face into the worked space. Thus, the quarry will seemingly slide from place to place. In front it will bite into the earth, and in back it will fill it up with barren rock. Coal will be extracted in a similar manner which enters the accumulation bins, the coal warehouses of the GRES and the railroad station. The use of this technology will yield an unheard of output, 2,500 tons per month for each worker with a net cost of only 1.5 rubles per ton.

This is the plan. But how real is it?

"The scientific-technical problems of developing the Kansk-Achinsk basin are being worked over fairly extensively," this is the opinion of the expert from the department of mineral resources of the USSR State Committee for Science and Technology, V. Spiridonov. "A target complex program has been developed and is already being implemented to create the equipment and technology of extraction. It is all a matter for the machine builders."

Unfortunately, these hopes placed on the machine builders are not rosy, even now the Ministry of Heavy and Transport Machine Building has not fulfilled the schedules for delivering continuous-action machines. The Krasnoyarsk plant of heavy excavators, despite the unheard of rates of construction, will only produce the first two single-bucket excavators next year. Installation of the stripping and extracting complexes should be starting today. It would seem that all of this had been stipulated in advance. For example, planning of the extracting rotary complex was completed 2 years ago. Last year the Zhdanov 50th Anniversary of the Great October Revolution Plant of Heavy Machine Construction should have supplied 1,500 tons of assemblies and designs to the Berezovskiy open pit. But in fact the shipments only began in March of this year. The plant has abandoned altogether the manufacture of the swing chutes, main and face conveyers.

The situation is no better with the powerful complex for stripping operations. Here the Ministry of Heavy and Transport Machine Building unilaterally broke the contract for manufacture and supply of the most important equipment. It is clear that all of this threatens the schedule for start-up of the Berezovskiy open pit which was planned for 1985.

But the Ministry of the Coal Industry and the Ministry of Heavy and Transport Machine Building cannot yet find a common language not only in the current matters, but also in their opinions of the future.

"Strictly speaking, the complex with output of 5,250 cubic meters per hour which is being readied for shipment does not completely satisfy us," announced the deputy minister of the USSR coal industry M. Shchadov at the conference. "Studies have demonstrated that it is expedient to use more powerful equipment in these open pits. But the machine builders are not ready to make it. Therefore the first decisions made for the mechanization plans were forced to a certain measure. We have to go further. But the work to make equipment with output of 12,500 cubic meters per hour is going very slowly. We cannot help but be concerned that the powerful machines manufactured today are not designed to operate in the harsh climate conditions of Siberia."

It is easy to imagine what would happen if the superpowerful extracting complex suddenly stopped for an unplanned repair because of strong frosts which are certainly no rarity in this area. The power engineers, and especially the railroad workers need a uniform supply of coal, and in greater quantities in winter and smaller quantities in summer. In order to guarantee this delivery schedule, it is necessary to make a buffer storage of 1.2 million tons of coal already at the first phase of Berezovskiy open pit No 1, or in other words, enough for 400 railroad rolling stocks. But at the same time, the same Berezovskiy GRES, according to the approved plan, must have an incombustible emergency reserve on the order of 740,000 tons of coal. Consequently, two warehouses with total capacity of about 2 million tons will appear only 15 km away. Is this decision justified? This question has been discussed many times. The Ministry of the Coal Industry has suggested making a unified warehouse which will almost doubly reduce the quantity of necessary equipment and will significantly diminish the capital and operating expenditures. But this suggestion is still stuck in the slush of departmental interests of the USSR Ministry of Power and Electrification and the USSR Ministry of the Coal Industry.

Such lack of harmony can be understood: in the example of KATEK, we started on the path to solving complex national economic tasks of unheard of scale whose complexity was multiplied by harsh natural conditions. Here we will have a lot to learn and the necessary experience to accumulate. But there are fundamental questions on whose timely resolution depends the success of the entire program for economic development of this kray. It is common knowledge that KATEK must become the power base for the creation of metallurgical, chemical, pulp-paper and other energy-intensive industries in the region. What is necessary to provide them with power?

"By the end of the five-year plan, we need to receive 70 million tons of coal," announced the minister of power and electrification P. Neporozhniy at the conference.

"The deputy minister of the coal industry M. Shchadov, speaking of the future plans, named another figure:

"The total coal extraction for the basin must be 50 million tons by the end of the five-year plan."

Behind these statements there is not simply a desire for the consumer to receive more and the supplier to give less. The ministries supplied resources for this plan. Great efforts are required to eliminate these discrepancies between the coal miners and the power engineers. The necessary steps in this direction are already being undertaken. But there is the danger that another important task will be threatened, the problem of obtaining synthetic liquid fuel from the Kansk-Achinsk coal (see SOTSIALISTICHESKAYA INDUSTRIYA of 30 June 1981). It is possible that 20 million tons of coal per year will be needed in future years for these purposes. Where will they come from?

The complexities of forming KATEK are not limited to these problems. But if we try to isolate the main one, then, judging from the speeches at the conference, this is separateness of efforts.

"The 'lightest' place in KATEK today is coordination of activity of individual ministries and departments," secretary of the Krasnoyarsk party kraykom L. Sizov said in his speech. "Practically all the main industrial sectors are participating in its creation. It is a very complicated business to correlate their sometimes contradictory interests, taking into consideration the enormous volume of work. Unfortunately, we do not yet have effective methods and organizational forms which permit a combination of regional and branch control, and rapid maneuvering of forces and resources. Their lack often results in a disruption of proportionality and decrease in the rates of development of the complex."

I can retort to the pessimists that the situation in this question is not hopeless. The All-Union Scientific Research Institute of Systems Studies has developed a number of versions of interbranch control of KATEK. One of them, for example, stipulates the creation on cooperative principles of a powerful industrial association. The participating ministries transfer resources, funds, limits on labor, construction and other facilities for its running. They have control of the association which includes the managers of the ministries. This management is located in Moscow. A unified board made of leaders of the client organizations implements direct and comprehensive coordination of the efforts of different departments. But Academician A. Aganbegyan believes that for effective control of the complex, the coordinating agency must be formed as a commission of the USSR Council of Ministers.

Strange? But in fact we are encountering tasks like the creation of KATEK and other complexes for the first time. The words of Comrade L. I. Brezhnev at the 26th Party Congress have a direct relationship to them: "Improvement in the organizational structures of control does not tolerate inertness. It is impossible to adapt the living, developing organism of control of the economy to stabilized, customary forms. On the contrary, the forms must be brought into correspondence with the changing economic tasks."

9035

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FUELS

FARMING, COAL MINING INTERESTS CLASH IN KARAKANY

Moscow IZVESTIYA in Russian 11 Jul 81 p 2

[Article by P. Voroshilov, in-house correspondent of IZVESTIYA: "Plowed Field above Coal: Need to Complexly Develop Natural Resources"]

[Text] We are standing at the very crest of the hill that hangs precipitously over the quiet plain river. Behind it is a vast countrified and maintained valley. Tracts of grain are accurately planted in forest-protected bands and ribbon birch groves. The large Siberian village of Karakany has well-built residences, impressive animal husbandry buildings and technical workshops shaded with spreading trees. The overflowing pond glistens in the sun like a fragment of blue sky. The exposed coal bed in this rural picture is perceived like an accidental dirty smear. Karakany was surprised. This spacious valley, once the former laguna of an ancient sea, turned out to be literally larded with coal. And what coal!

"Layered cake in a shallow dish," explained V. I. Tsaregorodtsev, chief technologist of technical direction for the production association "Kemerovougol'." "A unique phenomenon."

The layers are 52 working beds located one above the other almost horizontally, with reserves of about 2.8 million tons explored in detail. The fact that the "dish" is shallow is also of fundamental importance. The country's fuel balance is formed so that in this five-year plan it is necessary to increase coal extraction in Kuzbass by 7 million tons, and in the future by another 20. The active enterprises cannot cope with this burden, new facilities are needed, and they are being formed. But the construction of a mine takes 10-12 years. Where is the solution to the problem? It was defined with all sagacity and party exactingness by the 26th CPSU Congress which aimed the Kuzbass miners at advanced development of open pit mining. Labor productivity in the open pits is doubly higher and the cost of the coal is doubly lower than that of the best deep mines. It is possible to reduce the initial capital investments, which are moreover completely compensated for in 2-3 years. At Karakany, 16 beds are suitable for open pit mining. The uppermost of them, 15 meters thick, from the viewpoint of the operators, is hardly covered. There are only three cubic meters of rock per ton of coal. In other places, a ratio of 1 to 10 is considered good.

Karakany has that most valuable coking coal which ferrous metallurgy of the entire country cannot do without today.

It was hypothesized that the first phase of the open pit "Karakanskiy-1-2" would start up in 1984. This period was defined by the five-year plan. But the miners have advanced counter suggestions, to build the open pit in stages, start it up in individual sections, and thus take roughly 3 million tons of coal a year earlier.

It is a bold decision. The association "Kemerovougol'," by the way, is the only one in the Ministry of the Coal Industry that in the last 15 years not only systematically overfulfilled increased planned assignments, but also increased the average annual extraction by over 2-fold and significantly improved the quality indicators. Today over 400,000 tons of coal have already been registered in its above-plan account. However, alarming symptoms have begun to appear more clearly: stripping of beds is lagging, the effectiveness of the employed machine fleet is dropping, land used for the mining dumps is being recultivated more slowly than necessary.

The reason is that the geological and production conditions are becoming more complicated: the open pits are buried deeper and more distant sections are being worked, while the supplies of equipment do not compensate for these changes. The number of excavators and drilling units is even diminishing. A considerable number of bulldozers do not meet the technological requirements for power. The transportation equipment needs to be replaced. There are not enough spare parts and the supply systems of the enterprises are lagging, especially the repair services.

The construction of housing is behind the needs. Therefore the shortage of personnel in the open pits has acquired a chronic nature. The increase in number of workers has dropped 4-fold. They should cope with the current problems, instill the proper order in the available services, and not make plans for tomorrow.

"But preparation of a stable work front for the future," states L. Reznikov, general director of the association, "is also part of our current commitments. The mine-construction organizations of the oblast are severely overloaded. This means that in developing a new region we are forced to orient ourselves mainly on our own forces. The solution is the only applicable one. Without start-up of facilities at Karakany, we will not solve the tasks set for Kuzbass for the near future."

The initiative of the miners was approved by the party obkom, the ispolkom of the oblast soviet and was warmly supported in the Ministry of the Coal Industry. A program of action was defined and measures were taken for its implementation. In particular, corrections were made in the plans for financing the construction, and the schedules for delivery of equipment, materials and transportation were corrected. The institute "Kuzbassgiproshakht" accelerated the preparation of the technical documents and is focusing a lot of attention on the preparation of working drawings for the primary facilities.

In a word, the work that has been started is acquiring greater scope and the necessary rates are gradually picking up. But a green light does not burn everywhere on the path to coal. The field is not being developed in the sparsely populated taiga. The valley has long had strong masters, three kolkhozes and a sovkhov. They view their new, efficient neighbors without special joy, and cautiously.

"Even in the worst times, we gather 17-18 centners of grain per acre. We completely supply the public cattle with feed. We have built up the village. And

now you are going to bulldoze under all of this good? Why should you? The land which feeds us also has its value. Even wormwood will not grow in a hundred years on clay that excavators have turned over.

Reasoning thus, the chairman of the kolkhoz "Kuzbass," V. Kurskiy, is not even defending his own self interests.

There are 0.5 hectares of plowed field per capita in the Kemerovskaya Oblast. The food program of the oblast that is being developed in light of the decisions of the 26th Party Congress, advances to the forefront the problem of the intensive use of the land and increase in its fertility. Therefore, pseudoscientific recommendations about setting aside, "conserving" the chernozem for lengthy safe-keeping can't be of use to anyone. The plowed land is supposed to be worked always and with the maximum output. The local party and soviet agencies occupy a clear and consistent position in this question. Coal is necessary but bread has never been considered unessential.

The transportation mains and the engineering communications have not been made by the shortest distances in Karakany, but through inconvenient areas. Did it cost more? This is how they figured it. A saving is a saving when it takes into consideration not the branch profits, but the ultimate state interests. The new open pit needs over 3,000 hectares of land. Is it worth it to occupy it all immediately? Is it not better to take it in sections, as it is necessary? Indeed, making another allotment is not so hard to do nor so costly as excluding large parcels of land from crop rotation for long periods. Hasty land stripping, as experience has shown, noticeably lowers the water table and disrupts the natural hydrologic regimen on adjacent fields. Thus we are concerned with more than a simple compensation of arable lands--hectare by hectare--we are concerned with the construction of irrigation systems.

A cow shed for 400 head has been included among the start-up facilities in the first phase of "Karakanskiy-1-2." Agreement with the kolkhoz for the period of its construction, capital investments and volumes of work did not cause any unfavorable criticism. Compensation for the occupied lands is being delayed under various pretexts. The miners do not even have planned formulations on this subject yet. The economic substantiations have not been prepared and the sources of financing have not been defined.

"It is incomprehensible why," states the deputy chairman of the oblispolkom G. Safronov, "this tardiness is permitted. Our contract commitments cannot be based on unofficial promises. The laws of land use are written for all and must be fulfilled quickly."

Karkany needs a railroad line. Millions of tons of coal cannot be hauled in dump trucks, the gratification is too expensive. A constant LEP-110 [high power transmission line] is also needed. It cannot be raised with in-house forces. The participation of specialized trusts "Kuzvasstransstroy" and "Sibelektroset'stroy" is needed. Their subdivisions are at the planned facilities, and do not have any reserve forces.

The house-warming in the mining settlement should take place in the fourth year of the five-year plan. This requires an annual settlement of 3-4 900-apartment buildings, family and youth dormitories. Again a misfire. In the new region, the

kombinat "Kuzbasszhilstroy" has neither a construction administration, nor a production base. Certain planning institutes and plants of heavy and power machine building have to make significant priorities in the working schedules. They cannot do without rapid help, the coordinated solutions of the union and republic ministries and the USSR Gosplan. There is a lot of work. But the opinion of the kolkhoz chairman V. Kurskin also cannot be side-stepped. It should be taken into consideration most seriously and conclusions drawn.

The coal of Karakany can already be held in the hand as a souvenir. Heated by the summer sun, the glossy clump gives off pleasant warmth. But the main battle for it is still unfolding on the near and distant approaches. Success is determined by onslaught with a unified front.

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FUELS

BRIEFS

SURGUT-POLOTSK PIPELINE CONSTRUCTION--Tyumen'--The Mugenskaya oil-transfer pumping station has gone into operation on the Surgut-Polotsk trunk pipeline. The erection of two more stations on the northern shoulder of the steel arterial is now nearing its end. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 18 Jul 81 p 1] 11409

KARAKALPAK TOWN GETS GAS--Beruni (Karakalpakskaya ASSR)--The traditional blue flare blazed up on the outskirts of the town of Beruni. Natural gas has come here. It is arriving over an arterial that starts at Turkmenia's Gaz-Achak field. Now the gas pipeline builders have advanced to the east--into the depths of the Kyzyl-Kum desert. The Karakalpak gas network now stretches out for 600 kilometers. According to the autonomous republic's plan for economic and social development during the current five-year period, natural gas will be delivered to every community. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 18 Jul 81 p 1] 11409

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